CAPITAL BUDGETING FOR REPLACEMENT PROJECT EVALUATION
(Study at PG Krebet Baru Bululawang Malang)

Aning Sri Rahayu
Suhadak
R. Rustam Hidayat
Faculty of Administrative Science
University of Brawijaya
Malang
Email: aningsrirahayu@gmail.com

ABSTRACT

The objective of this research is to evaluate the feasibility of long-term investment related to asset replacement project in PG Krebet Baru used capital budgeting techniques include payback period, accounting rate of return, net present value (NPV), benefit cost ratio (B/C ratio) and internal rate of return (IRR). Type of research is descriptive research with the case study method. Payback period method is equal to 14,93 years, it is faster compared to the useful life of assets that reach 20 years old. Accounting rate of return generate value 0,86 which is higher than value of ROE 2012 that equal to 0,75. Net present value obtained positive results equal to 733.121.448,90 with discount factor counted to17.17%. The B/C ratio is 1,05 times, IRR equal to 17,55%, it is greater than the cost of capital counted to 17.17 %. Based on these five methods, it can be concluded that the replacement project is feasible to be implemented by PG Krebet Baru.

Key words: Replacement project, capital budgeting, payback period, accounting rate of return (ARR), net present value (NPV), benefit cost ratio (B/C ratio), internal rate of return (IRR)

ABSTRAK

Penelitian ini bertujuan untuk mengevaluasi kelayakan investasi jangka panjang dalam bentuk penggantian aset di PG Krebet Baru dengan menggunakan teknik capital budgeting *meliputi* payback period, accounting rate of return (ARR), net present value (NPV), benefit cost ratio (B/C ratio) *dan* internal rate of return (IRR). *Penelitian ini adalah penelitian deskriptif dengan menggunakan metode studi kasus. Metode* payback period *proyek penggantian aktiva akan terjadi setelah proyek berjalan selama 14,93 tahun, lebih cepat jika dibandingkan dengan usia ekonomis aset yang mencapai 20 tahun. Metode* ARR *menghasilkan nilai 0,86 dimana nilai ini lebih tinggi dibanding nilai ROE tahun 2012 senilai 0,75. Menggunakan metode* NVP, *investasi layak untuk dilakukan karena menghasilkan* NPV *positif senilai Rp 733.121.448,90 pada* discount factor *17.17%. Metode* B/C ratio menunjukkan *proyek bernilai 1,05 kali, sedangkan* IRR *proyek 17,55%, lebih besar dari* cost of capital *proyek senilai 17.17 %. Berdasar lima metode tersebut, maka dapat disimpilkan bahwa proyek penggantian aset tersebut layak untuk dijalankan oleh PG Krebet Baru*

***Kata kunci: Proyek penggantian,* capital budgeting, payback period, accounting rate of return (ARR), net present value (NPV), benefit cost ratio (B/C ratio), internal rate of return (IRR)**

INTRODUCTION

A firm has a purpose to keep the sustainability of their business. In order to reach this purpose, firm needs to invest their fund continually in assets that will produce incomes and cash flows (capital investment). Making capital investment decision is not easy because many alternatives investment, which is followed by risks and uncertainty.

According their economical life, investment is divided to be short-term and long-term investments. Focusing on long-term investment, it occurs when firm try to invest their assets and get back of investment more than one year or period. Decisions about long-term assets are based on projections of cash flows far into the future and require them to consider the time value of money.

Rich et al (2010:365) stated, "Capital expenditure is expenditure that extend the life of asset, expand productivity capacity, increase efficiency, or improve the quality of the product. Capital expenditure typically involves relatively large amounts of fund." Capital expenditures may be incurred because of several reasons such as growth, increased sales, increased production, changes in production methods, cost reduction, productivity, improvement in product quality, new business, and normal replacement (Shim and Siegel, 2008:201).

One of the capital expenditure activities is replacement projects. Based Brigham and Houston (2003: 511) "Replacement project was divided to be two, replacement project for business maintenance and cost reduction." Evaluating the replacement project, firm needs to compare firm value with the replacement asset and value without a replacement asset. It is important because capital investment decisions place large amounts of resources at risk and uncertainty for long period and simultaneously affect the future development of firm. Method that could be applied to analyze capital expenditure investment is capital budgeting.

"Capital budgeting is the process of making long-run planning decision for investments in project" (Horngren, 2012:739). Project analysis is important in order to get best investment that could create maximum return. In capital budgeting there are 5 techniques, including payback period, accounting rate of return (ARR), net present value (NPV), benefit cost ratio (B/C ratio) and internal rate of return (IRR).

These 5 techniques could be divided to be non-discounting and discounting models. Payback period and ARR was categorized as non-discounting model, while NVP, B/C ratio and IRR was categorized as discounting model.

Sugar has become one of the staples in which the availability and affordability is very important. According to Kusbiantoro (2013) national sugar production in 2012 reached 2.56 million tons, increase of 30% compared to 2011. However, it has not been able to cover the needs of the national consumption of sugar that reached about three million tons. Indonesian Sugar Council members, Arum Sabil (2013) expressed Indonesia needs to increase the installed capacity of 213 thousand tons of cane per day (TCD) to 500 thousand tons TCD. It means that all sugar mills in Indonesia need to prepare an investment project in order to deal with national sugar demand that always increase year by year.

PG Krebet Baru is one of sugar mill located in Bululawang, Malang. In 2012, along with PG Kebonagung, Krebet Baru contributes 20% of 2.5 million tons national production target. However, due to weather anomalies in 2011, the production number of Rajawali Nusantara Indonesia (RNI) Group as holding company of PT PG Rajawali I which is superintendant of PG Krebet Baru, only about 290 thousand tons, down 30 percent from a year earlier.

Based on pre-research with the manager of finance and accounting department, in 2014 PG Krebet Baru plans to replace several plants include cooling trough, roll up and roll down reshelling, low grade rotation tool, and bottom metal roll units. The reason to replace those assets based on 2 points, first due to obsolete condition and second, there is necessity to help the business operation of PG Candi Baru Sidoarjo as the subsidiary company of PT RNI so that PG Krebet Baru will hand over several plants. However, before carry out this replacement project, PG Krebet Baru should to know the feasibility of project, and then PG Krebet Baru could decide to accept or ignore the investment based the payback period, NVP, B/C ratio and IRR techniques.

LITERATURE REVIEW

Capital Budgeting

Brigham and Houston (2003:535) stated, "Capital budgeting is the process of analyzing potential fixed asset investments". Needs and importance of capital budgeting include huge investments of funds, capital expenditure, irreversible asset, and long-term effect.

Techniques analysis on capital budgeting is divided to be non-discounting and discounting. Non-discounting models ignore the time value of money such as payback period and ARR, whereas discounting models explicitly consider it such as NPV, B/C ratio, IRR. "Payback period is the time required for a firm to recover its original investment" (Horngren et al, 2012:743). If the payback period is less than the maximum acceptable payback period, accept the project and vice versa.

ARR measures the return on a project in terms of income. Decision rule of ARR is based on ROE.

If the value of ARR is ≥ ROE, project will be accepted, and vice versa.

NVP is how much the surplus of present value cash inflow upon present value of initial investment. Decision criteria to accept or reject investment project by NVP as follow: if the value of NPV is ≥ 0, then the project will be accepted an vice versa. Benefit cost ratio (B/C Ratio) or profitability index (PI) measure present value of each fund that is invested. The decision rule to accept or reject analysis of B/C ratio: when the index of B/C ratio is ≥ 1.0, the project is feasible to be implementedand vice versa. "IRR is interest rate that sets project's NPV at zero." (Hanson and Mowen, 2007:570). If the IRR is greater than the cost of capital (IRR ≥CoC), project will be accepted and vice versa.

Cash Flows

"The most important, but also the most difficult, step in capital budgeting is estimating projects' cash flows — the investment outlays and the annual net cash inflows after a project goes into operation" (Brigham and Houston, 2003:548). Cash flow is a flow and it is different with net income (Brigham and Houston, 2003: Fabozzi and Drake, 2009). Specific cash flow that should be considered in analysis of capital budgeting called as incremental cash flows. Incremental cash flows are the incremental cash outflows (investment) and inflows (return). Incremental cost explained as the net cash flow or additional cash flow attributable to an investment project.

Gitman and Zutter (2012:428), stated that cash flows of any project may include three basic components: (1) an initial investment, (2) operating cash inflows, and (3) terminal cash flow. Initial investment refers to the relevant cash outflows to be considered when evaluating a prospective capital expenditure, occurred at time zero. Operational cash inflows are cash flow from implementation of a project during its life that must be measured on an after-tax basis. Gitman and Zutter (2012:443) stated, "Terminal cash flow is the cash flow resulting from termination and liquidation of a project at the end of its economic life".

Cost of Capital

Gitman and Zutter (2012:358) stated that, "Cost of capital represent the firm's cost of financing and is the minimum required rate of return that must be earned by project in order to increase firm value." Cost of capital also called as discount rate. Higher risk on investment project means higher rate of return required to compensate suppliers of capital for risk they bear. According to Brigham and Houston (2003:464), cost of capital can be divided into four types of individual cost of capital, namely; Cost of Debt ($k_d(1-T)$), Cost Of Preferred Stock, (k_p), Cost of Retained Earnings (k_s), Cost of New Common Stock (k_e)

Cost of debt is financing cost associated with new fund raised through long-term borrowing (Gitman and Zutter, 2012:360). The calculation of it uses cost of capital after-tax so it can be tax reduction. "Cost of preferred stock means the rate of return investors require on the firm's preferred" (Brigham and Houston, 2003: 467). Cost of retained earning means rate of return required by stockholders on a firm's common stock. it can be calculated by using Capital Asset Pricing Model (CAPM), Bond Yield Plus Risk Premium Approach, Dividend Yield Plus Growth Rate, or Discounted Cash flow (DCF) Approach. Cost of new common stock means the cost of external equity; based on the cost of retained earnings, but increased for flotation costs (Brigham and Houston, 2003:474)

Least Square Method

Anggarwal and Khurana (2011: 295) stated, "Least square is the best method of trend-fitting in a time series and is most used in practice. This method can be used to fit straight-line trend, parabolic trend, or exponential trend". Trend could be assumed as pattern that be created from data series occurred in several years to predict future condition.

Capital Expenditure

"Capital expenditure defined as an expenditure incurred for acquiring or improving the fixed asset, the benefit of which are expected to be received over a number of years in future" (Bhat and Rau, 2008: 257). Four classifications of capital expenditure include replacement, expansion, safety and/or environmental projects and other. Gitman and Zutter (2012:390) stated, "Basic motives for capital expenditures are to expand operations, to replace or renew fixed assets or to obtain some other, less tangible benefit over a long period."

Replacement Expenditure

Replacement project has purpose to replace existing equipment or facilities to create cost reduction or improve efficiency. Evaluating replacement projects, researcher needs to compare the value of the firm with the replacement asset to the value of the firm without that same replacement asset by analyze and calculate the opportunity costs.

Depreciation

Based Horne (2008; 21) depreciation is the systemic allocation of the cost of a capital asset over a period of time for financial reporting purpose, tax purpose or both. According to Brigham and Houston (2003; 42). There are three depreciation methods uses the following straight-line depreciation, sum-of-the-years' digits depreciation, double-declining-balance depreciation

RESEARCH METHOD

The type of research is descriptive research with case study approach supported by quantitative data. According to Kumar (2011:10), "Descriptive research is a kind of research model that attempt to describe systematically a situation, problem, phenomenon, service or program, or provide information about a living condition of a community, or describes attitudes toward an issue." Case study approach according to Kumar quoted from Gilbert (2008: 36) explains that case study is an approach in which particular instances of a few carefully selected cases are studied intensively."

The focus of this research is production and of replacement project data. Research held at PG Krebet Baru at Bululawang street No. 10 Malang. Site of research is carried out in administration and finance department. Source of data is secondary source in the form internal secondary data consist of company profile, financial statement 2010-2012, rate of sugarcane yield 2008-2033, Production data consist of milled sugarcane quantity, selling price, cost of production 2008-2012 and replacement project plan 2014.

Data Analysis

1. Calculating the initial investment occurred due to the replacement project.

$$\text{Initial investment} = \text{Installed cost of new asset} - \text{After tax proceeds from sales of old asset}$$

(Gitman and Zutter, 2012:433)

2. Calculating the depreciation by using straight line method

$$Dm = \frac{P - F}{N}$$

(Peterson, 2009: 97)

3. Determining the discount factor

$$ks = k_{RF} + RP$$

(Brigham and Houston, 2003: 467)

4. Projecting the revenue of PG Krebet Baru 2013-2033 used least square method with middle year 2010.

$$Y = a + b\,(X)$$

(Anggarwal and Khurana, 2010:296)

5. Projecting the cost of production of PG Krebet Baru 2013-2033 by least square method
6. Projecting income statement
   Projecting income statement is calculated based on revenue subtracted by cost projection.
7. Projecting the incremental cash flow by subtracting cash flow of new plant by earnings after tax of old asset
8. Appraising the feasibility of investment by using capital budgeting methods
   a. Payback period (PP)

$$PP = \text{Year before full recover} + \frac{\text{Unrecovered cost at start of year}}{}$$

(Brigham and Houston, 2003:512)

   b. Average Rate of Return

$$\text{Accounting rate of return (ARR)} = \frac{\text{Average income}}{\text{Original investment or average investment}}$$

(Hanson and Mowen, 2007:568)

$$\text{After} - \text{tax ROE} = \frac{\text{Net Profit After Taxes}}{\text{Equity}}$$

(Peterson, 2009: 144)

   c. Net Present Value

$$NVP = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - CF_0$$

(Gitman and Zutter, 2012: 397)

   d. Benefit cost ratio

$$B/C\ \text{ratio} = \frac{\text{Present value of the change in operating cash inflows}}{\text{Present value of the investment cash outflows}}$$

(Fabozzi and Peterson, 2004:79)

   e. Internal rate of return

$$\sum_{t=1}^{n} \frac{CF_t}{(1+IRR)^t} - CF_0 = \$0$$

(Gitman and Zutter, 2012: 401)

RESULT AND ANALYSIS

Calculating Initial Investment

Total initial investment that required to perform replacement project is IDR 13.286.000.000.

Table 1 Initial Investment PG Krebet Baru 2014 (in IDR 1000)

No	Investment	Installed cost	Book value	Sales price	Proceed	Tax 10%	Initial investment
1	2 unit of units of cooling trough	3.000.000	360.000	400.000	40.000	4.000	2.604.000
2	1 unit Roll up and down Reshelling	3.000.000	420.000	Handed over to PG Candi Baru	-	-	3.000.000
3	2 units of Low-grade Rotation tool capacity each 15 tons/hour	6.000.000	600.000	Handed over to PG Candi Baru	-	-	6.000.000
4	4 units Bottom Roll Metal	2.000.000	300.000	320.000	20.000	2.000	1.682.000
Total Initial Investment of Replacement Projects							13.286.000

Source : processed data

Depreciation of New Plants

Depreciation method in PG Krebet Baru uses straight-line method.

Table 2 Depreciation of New Plants in PG Krebet Baru (in IDR 1.000)

No	Replacement Equipment	Initial Investment	Economic Values (year)	Depreciation per Year
1	Two Units of Cooling Trough	2.604.000	20	130.200
2	One Units of Roll Up and Down Reshelling	3.000.000	20	150.000
3	Two Units of Low-Grade Rotation Tool Capacity 15 Tons /Hour	6.000.000	20	300.000
4	Four Unit Bottom Roll Metal	1.682.000	20	84.100
Total		13.286.000	20	664.300

Source: processed data

Determining the Discount Factor

Source of fund to undertake the project of replacement of fixed assets in PG Krebet Baru derived from retained earnings. Referring to Fernandez et al (2013), risk premium for Indonesia in 2012 is 11,40% and risk-free rate of Indonesia in 2012 amounted to 5.77%. Value of the risk-free rate presented in table as follow:

Table 3 BI Rate January–December 2012 in %

Date	BI Rate	Date	BI Rate
12 January	6,00	12 July	5,75
9 February	5,75	13 August	5,75
8 March	5,75	13 September	5,75
12 April	5,75	11 October	5,75
10 May	5,75	8 November	5,75
12 June	5,75	11 December	5,75
Average of BI Rate		**5,77**	

Source: pusatdata.kontan.co.id/v2/makro/bi_rate/, (processed data)

Discount factor of PG Krebet Baru replacement project will be as follow:

$$ks = k_{RF} + RP$$

(Brigham and Houston, 2003: 467)

ks = 5,77 % + 11,40 %

ks = 17,17%

Number of 17,17% is stated as minimum required rate of return if company tried to conduct replacement project by using retained earnings as the source of investment.

Projecting Revenue of PG Krebet Baru

First step, determine the trend of milled sugarcane then estimate the number of milled sugarcane during 2013-2033 in PG Krebet Baru with obtained equation trend of milled sugarcane 2008-2012, $Y = 18.152.000 - 23.200(X)$.

Second step, there are two main product of PG Krebet Baru, sugar and molasse. Calculating the number of sugar product produced by PG Krebet Baru during 2013–2033 is done by multiply estimation rate of sugarcane yield with number of milled sugarcane. Molasses is estimated 5% of the number of milled sugarcane.

Third step, estimate number of sugar and molasses owned by PG Krebet Baru during 2013 – 2033. The treaty of sugar production sharing between PG Krebet Baru and farmer is 34%:66%. Here also calculate the number of sugar owned by PG if replacement project do not carry out. Molasses treaty sharing is 2% for PG Krebet Baru and 3% for farmer.

Fourth step, estimate the selling price of sugar and molasses. Trend of sugar price is $Y= 7.080 + 980(X)$. Trend of molasses price is $Y = 930 + 110(X)$.

Fifth step, estimate the total revenue of PG Krebet Baru from the outcome of selling sugar and molasses. The revenue without replacement project also calculated. (See appendix 1)

Projecting the Production Cost

Cost is projected one by one use least square method based on time series of cost production during 2008-2012. Then gather it total production

cost. Element of production cost in PG Krebet Baru includes:

a. Management cost with trend equation $Y = 18.758.803.400 - 1.858.163.500(X)$
b. Plantation Cost with trend equation $Y = 7.049.678.400 + 1.294.255.300(X)$.
c. Harvesting and Transportation Cost with trend equation $Y = 14.821.118.600 + 27.009.725.000(X)$
d. Fabrication of Sugar
   It has sub-costs that should be calculated deeply, include:
   1) Direct Labor Cost
      - Staff Cost with trend equation $Y = 2.542.373.800 + 98.777.200(X)$
      - Labor cost with trend equation $Y = 7.039.718.400 + 474.316.000\ (X)$
      - Employee cost with trend equation $Y = 5.281.549.800 + 185.429.500(X)$
   2) Fuel Cost
      There are 2 main fuels used, bagasse and wood shaving respectively 90:10. Additional bagasse bought from other party is 60%.
      - Bagasse quantity equation = 90% x estimation of milled sugarcane in 2013 x $\frac{0,75}{100}$, Trend equation of price Bagasses is, $Y = 570 + 35(X)$
      - Equation of wood shavings quantity = 10% x estimation of milled sugarcane in 2013 x $\frac{1}{100}$, Trend equation of wood shavings price is, $Y = 395 + 32,5(X)$.
   3) Lubricants and Electricity with trend equation cost $Y = 1.884.692.200 + 288.105.900(X)$
   4) Filtering cost with trend equation, $Y = 400.955.000 + 29.512.700(X)$.
   5) Fabrication lime with trend equation $Y = 585 + 2(X)$
   6) Chemical Materials with trend equation

      $Y = 1.807.271.000 + 457.732.800(X)$
   7) Miscellaneous Cost with trend equation $Y = 5.318.585.000 + 713.871.800(X)$
e. Packing and transportation Cost with trend equation $Y = 4.132.754.400 + 509.558.800(X)$
f. Maintenance cost with equation trend $Y = 31.857.856.800 + 6.175.880.100(x)$
g. Depreciation Cost with trend equation $Y = 20.571.662.800 + 3.734.354.100(X)$
h. Business cost with trend equation $Y = 27.300.205.200 + 2.667.567.400(X)$
i. Miscellaneous earnings with trend equation $Y = 1.410.214.000 - 30.626.600\ (X)$
j. Miscellaneous expenses with trend equation $Y = 32.902.295.200 - 349.079.000\ (X)$

Table 4 Estimation of cost production

Year	Total production cost	Year	Total production cost
2013	189.031.456.250	2024	396.668.727.520
2014	207.912.394.520	2025	415.539.055.850
2015	226.792.368.250	2026	434.408.419.640
2016	245.671.377.440	2027	453.276.818.890
2017	264.549.422.090	2028	472.144.253.600
2018	283.426.502.200	2029	491.010.723.770
2019	302.302.617.770	2030	509.876.229.400
2020	321.177.768.800	2031	528.740.770.490
2021	340.051.955.290	2032	547.604.347.040
2022	358.925.177.240	2033	566.466.959.050
2023	377.797.434.650		

Source: processed data

Estimating Earnings After-Tax of PG Krebet Baru with Replacement Project 2013-2033

This earning calculated by subtracts revenue by total production if PG Krebet Baru did carry out replacement project. (See appendix 2)

Estimating Earnings After-Tax of PG Krebet Baru without Replacement Project 2013-2033

This earning calculated by subtracts revenue by total production if PG Krebet Baru did not carry out replacement project. (See appendix 3)

Estimating Incremental Cash Flow

Incremental cash flow generated by subtracts cash flow with new plants by cash flow without new plant. (see appendix 4)

APPRAISING THE FEASIBILITY OF REPLACEMENT PROJECT USE 5 CAPITAL BUDGETING METHODS

Payback Period

It refers to the time that needed to recover initial investment.

Table 5 Cumulative Cash Flow of PG Krebet Baru 2014-2033

Year	Year Of Investment	Incremental of EAT	Cumulative of Incremental Cash Flow
2014	0	-	-13.286.000.000
2014	1	89.950.000	-13.196.050.000
2015	2	89.950.000	-13.106.100.000
2016	3	89.950.000	-13.016.150.000
2017	4	89.950.000	-12.926.200.000
2018	5	152.950.000	-12.773.250.000
2019	6	152.950.000	-12.620.300.000
2020	7	152.950.000	-12.467.350.000
2021	8	166.075.000	-12.301.275.000

2022	9	166.075.000	-12.135.200.000
2023	10	166.075.000	-11.969.125.000
2024	11	166.075.000	-11.803.050.000
2025	12	166.075.000	-11.636.975.000
2026	13	166.075.000	-11.470.900.000
2027	14	1.264.603.617	-10.206.296.383
2028	15	10.969.537.682	763.241.298
2029	16	21.409.953.028	22.173.194.326
2030	17	32.582.371.048	54.755.565.374
2031	18	44.483.313.134	99.238.878.508
2032	19	57.109.300.677	156.348.179.185
2033	20	70.456.855.070	226.805.034.254

Source: processed data

$$\text{PP} = \text{Year before full recover} + \frac{\text{Unrecovered cost at start of year}}{\text{Cash flow during year}}$$

(Brigham and Houston, 2003:512)

$$\text{Payback Period} = 14 + \frac{10.206.296.383}{10.969.537.682}$$
$$\text{Payback Period} = 14{,}93 \text{ years}$$

Payback period of replacement project held by PG Krebet Baru is 14,93 years. This project could be accepted due to the payback period is shorter than the age of investment that reach 20 years.

Accounting Rate of Return

Table 6 Average EAT 2014-2033 of PG Krebet Baru

Year	Earnings After Tax	Year	Earnings After Tax
2014	-269.850.000,00	2024	-498.225.000,00
2015	-269.850.000,00	2025	-498.225.000,00
2016	-269.850.000,00	2026	-498.225.000,00
2017	-269.850.000,00	2027	600.303.616,80
2018	-458.850.000,00	2028	10.305.237.681,60
2019	-458.850.000,00	2029	20.745.653.028,00
2020	-458.850.000,00	2030	31.918.071.048,00
2021	-498.225.000,00	2031	43.819.013.133,60
2022	-498.225.000,00	2032	56.445.000.676,80
2023	-498.225.000,00	2033	69.792.555.069,60
Total of EAT	**228.180.534.254,39**	**Average of EAT**	**11.409.026.712,72**

Source: processed data

$$\text{Accounting rate of return (ARR)} = \frac{\text{Average income}}{\text{Original investment or average investment}}$$

(Hanson and Mowen, 2007:568)

$$\text{Accounting rate of return (ARR)} = \frac{11.409.026.712,72}{13.286.000.000,00}$$
$$\text{Accounting rate of return (ARR)} = 0{,}86$$

$$\text{After} - \text{tax ROE} = \frac{\text{Net Profit After Taxes}}{\text{Equity}}$$

(Peterson, 2009: 144)

$$\text{After} - \text{tax ROE} = \frac{71.778.997.500}{95.705.330.000}$$
$$\text{After} - \text{tax ROE} = 0{,}75$$

ARR is greater than ROE, so this project is feasible to be carried out by PG Krebet Baru due to the profitability will increase.

Net Present Value

Table 7 Present Value of Incremental Cash Flow Use Discount Factor 17,17% period 2014-2033

Year	Incremental Cash Flow	DF 17,17%	PVICF
2014	89.950.000	0,853461	76.768.797,47
2015	89.950.000	0,728395	65.519.158,04
2016	89.950.000	0,621657	55.918.031,95
2017	89.950.000	0,530560	47.723.847,36
2018	152.950.000	0,452812	69.257.583,09
2019	152.950.000	0,386457	59.108.631,12
2020	152.950.000	0,329826	50.446.898,63
2021	166.075.000	0,281494	46.749.053,43
2022	166.075.000	0,240244	39.898.483,77
2023	166.075.000	0,205039	34.051.791,21
2024	166.075.000	0,174992	29.061.868,41
2025	166.075.000	0,149349	24.803.164,98
2026	166.075.000	0,127464	21.168.528,62
2027	1.264.603.617	0,108785	137.570.210,14
2028	10.969.537.682	0,092844	1.018.455.072,36
2029	21.409.953.028	0,079239	1.696.495.983,30
2030	32.582.371.048	0,067627	2.203.450.894,77
2031	44.483.313.134	0,057717	2.567.446.411,21
2032	57.109.300.677	0,049259	2.813.161.554,52
2033	70.456.855.070	0,042041	2.962.065.484,52
Total Present Value Incremental Cash Flow			**14.019.121.448,90**
		Initial Investment	**13.286.000.000,00**
		NPV	**733.121.448,90**

Source: processed data

NPV of replacement project is 733.121.448,90. It is positive and it is ≥ zero. It means that the replacement project can be accepted by PG Krebet Baru.

Benefit Cost Ratio

$$\text{B/C ratio} = \frac{\text{Present value of the change in operating cash inflows}}{\text{Present value of the investment cash outflows}}$$

(Fabozzi and Peterson, 2004:79)

$$\text{B/C ratio} = \frac{14.019.121.448,90}{13.286.000.000}$$
$$\text{B/C ratio} = 1{,}05 \text{ times}$$

B/C ratio 1,05 times. The present value of each fund that is invested in replacement project is ≥ 1, so the replacement project can be accepted by PG Krebet Baru.

Internal Rate of return

Table 8 Present Value of Net Cash Flow with Discount Rate of 17% in 2014-2033

Year	Incremental Cash Flow	DF 44%	PVICF
2014	89.950.000	0,85470085	76.880.341,88
2015	89.950.000	0,73051355	65.709.693,91
2016	89.950.000	0,62437056	56.162.131,55
2017	89.950.000	0,53365005	48.001.821,84
2018	152.950.000	0,45611115	69.762.200,75
2019	152.950.000	0,38983859	59.625.812,61
2020	152.950.000	0,33319538	50.962.233,00
2021	166.075.000	0,28478237	47.295.232,76
2022	166.075.000	0,24340374	40.423.275,86
2023	166.075.000	0,20803738	34.549.808,43
2024	166.075.000	0,17780973	29.529.750,79
2025	166.075.000	0,15197413	25.239.103,24
2026	166.075.000	0,12989242	21.571.883,11
2027	1.264.603.617	0,11101916	140.395.230,80
2028	10.969.537.682	0,09488817	1.040.879.363,15
2029	21.409.953.028	0,08110100	1.736.368.611,86
2030	32.582.371.048	0,06931709	2.258.515.291,97
2031	44.483.313.134	0,05924538	2.635.430.785,30
2032	57.109.300.677	0,05063708	2.891.848.045,95
2033	70.456.855.070	0,04327955	3.049.341.182,22
		Total	**14.378.491.800,97**

Source: processed data

The equation of IRR is

$$\sum_{t=1}^{n} \frac{CF_t}{(1+IRR)^t} - CF_0 = \$0$$

(Gitman and Zutter, 2012: 401)

PV Net Cash Flow = 14.378.491.800,97
PV Initial Investment = 13.286.000.000,00 –
NVP = 1.979.026.374,55

Net present value is still ≥ zero. It means that the possible internal rate should be enhanced in order to make net present value of replacement project equal to zero.

Table 9 Present Value of Net Cash Flow with Discount Rate 18% period 2014-2033

Year	Incremental Cash Flow	DF 18%	PVICF
2014	89.950.000	0,84745763	76.228.813,56
2015	89.950.000	0,71818443	64.600.689,46
2016	89.950.000	0,60863087	54.746.347,00
2017	89.950.000	0,51578888	46.395.209,32
2018	152.950.000	0,43710922	66.855.854,62
2019	152.950.000	0,37043154	56.657.503,92
2020	152.950.000	0,31392503	48.014.833,83
2021	166.075.000	0,26603816	44.182.288,04
2022	166.075.000	0,22545607	37.442.616,98
2023	166.075.000	0,19106447	31.731.031,34
2024	166.075.000	0,16191904	26.890.704,53
2025	166.075.000	0,13721953	22.788.732,65
2026	166.075.000	0,11628773	19.312.485,30
2027	1.264.603.617	0,09854893	124.625.328,85
2028	10.969.537.682	0,08351604	916.132.341,02
2029	21.409.953.028	0,07077630	1.515.317.356,15
2030	32.582.371.048	0,05997992	1.954.287.980,18
2031	44.483.313.134	0,05083044	2.261.106.376,21
2032	57.109.300.677	0,04307664	2.460.077.014,92
2033	70.456.855.070	0,03650563	2.572.071.918,56
		Total	**12.399.465.426,43**

Source: processed data

PV Net Cash Flow = 12.339.465.426,43
PV Initial Investment = 13.286.000.000,00 –
NVP = -886.534.573,57

Internal rate that make NVP equal to zero lay between 17% and 18% thus need trial and error process followed by interpolation to determine the real value of IRR:

17%	14.378.491.800,97	14.378.491.800,97
Initial investment	-	13.286.000.000,00
18 %	12.399.465.426,43	-
	1.979.026.374,55	1.092.491.800,97

The real value of IRR = $17\ \% + \frac{1.092.491.800,97}{1.979.026.374,55}$ x 1%
= 17 %+ 0,552034988 %
= 17,55 %

From the calculation, the real value of IRR is 17,55%. According to the calculation, the value of IRR is greater than the required rate of return of replacement project (17,17%) therefore, the replacement project could be accepted by PG Krebet Baru.

CONCLUSION AND SUGGESTION

Conclusion

1. According to payback period technique, the replacement project in PG Krebet Baru is feasible to be implemented due to the payback period of replacement project estimated as long as 14,93 years. This replacement project could be accepted due to the payback period is shorter than the age of investment that reach 20 years.
2. According to ARR, it is feasible to be implemented due to the value of ARR is greater than ROE, where, ARR is 0,86 and ROE 2012 is 0,75.
3. According to NPV, it is feasible to be implemented due to with the cost of capital 17,17%, replacement project generate positive NPV amount to 733.121.448,90
4. According to B/C ratio, it is feasible to be implemented due to obtained value 1,05 times, greater than 1.

5. According to IRR, it is feasible to be implemented due to the IRR generates 17,55 %, it is greater than the cost of capital 17,17%.

Suggestion

1. According to the four result of feasibility using capital budgeting techniques, then the company plans to replace some of the old machines should be implemented. This is because the entire calculation of investment feasibility by capital budgeting technique states that the company's investment plans to replace old plants is feasible.
2. Seeing a healthy financial condition and profit greatly from year to year, the company should use available funds to do business development, example: opening a new sugarcane land to increase production of sugarcane, so entire milling capacity owned by PG Krebet Baru can be used optimally.

REFERENCES

Anggarwal, S.C and S. K. Khurana. 2011. *Business Statistic for BBA-II*. New Delhi: VK (India) Enterprises

Anonymous. 2013. *BI RATE,* accessed at August, 22 2013 from http://pusatdata.kontan.co.id/v2/makro/bi_rate/

Bhat, Sudhindra. 2008. *Financial Management – Principal and Practice 2nd edition.* New Delhi: Excel Books

Brigham, Eugene F, Joel, F. Houston. 2003. *Fundamentals of Financial Management, Concise 4E.* Mason: South-Western Cengage Learning

Daniel, P. Sam, Aroma G. Sam. 2011. *Research Methodology*. New Delhi: Kalpaz Publications

Fabozzi, Frank J., Pamela Peterson Drake. 2009. *Finance: Capital Markets, Financial Management, and Investment Management*. New Jersey: John Wiley & Sons, Inc.

Fabozzi, Frank J., Pamela P. Peterson. 2004. *Capital Budgeting: Theory and Practice.* New York: John Wiley & Sons Inc.

Fernandez, Pablo, Javier Aguirreamalloa and Luis Corres. 2013. *Market Risk Premium used in 82 countries in 2012: a survey with 7,192 answers.* Madrid : IESE Business School, University of Navarra

Gitman, Lawrence J., Chad J. Zutter. 2012. *Principles of Managerial Finance 13th ed*. Boston: The Prentice Hall

Hansen, Don R., Maryanne M. Mowen. 2007. *Managerial Accounting, Eighth Edition*. Mason : Thomson South-Western

Horngren, Charles T., Srikant M. Datar, Madhav Rajan. 2012. *Cost Accounting a Managerial Emphasis 14th ed.* New Jersey: Prentice Hall

Kumar, Ranjit. 2011. *Research Methodology a step-by-step guide for beginner.* New Delhi: SAGE Publication

Kusbiantoro, Didik.2013. "*Industri Gula Nasional Masih Bisa Bangkit*", accessed at August, 21 2013 from http://www.antaranews.com/berita/355799/industri-gula-nasional-masih-bisa-bangkit

Peterson, Steven J. 2009. *Construction Accounting and Financial Management.* Pearson. Upper Saddle River: New Jersey Education, Inc

Sabil, Arum. 2013. *Produksi Gula 2013 Diperkirakan Turun,* accessed at August, 21 2013 from http://www.metrotvnews.com/metronews/read/2013/05/09/2/152287/Produksi-Gula-2013-Diperkirakan-Turun

Shim, Jae K., Joel G. Siegel. 2009. *Budgeting Basics and Beyond*. New Jersey: John Wiley & Sons, Inc.

Appendix

Appendix 1 Estimation of Total Revenue of PG Krebet Baru 2013-2033

Year	Milled Sugar Cane	Rate Of Yield	Sugar	Molasses	PG's Sugar	PG's Molasses	Price of Sugar (kg)	Price Molasses (kg)	Earnings Sugar	Earning Molasses	Total Earnings
2013	18.082.400	8.99	1.625.607,76	904.120	552.706,64	361.648	10.020,00	1.260	553.812.051.676,80	45.567.648.000	599.379.699.677
2014	18.059.200	9.09	1.641.581,28	902.960	558.137,64	361.184	11.000,00	1.370	613.951.398.720,00	49.482.208.000	663.433.606.720
2015	18.036.000	9.19	1.657.508,40	901.800	563.552,86	360.720	11.980,00	1.480	675.136.321.488,00	53.386.560.000	728.522.881.488
2016	18.012.800	9.29	1.673.389,12	900.640	568.952,30	360.256	12.960,00	1.590	737.362.181.836,80	57.280.704.000	794.642.885.837
2017	17.989.600	9.39	1.689.223,44	899.480	574.335,97	359.792	13.940,00	1.700	800.624.341.622,40	61.164.640.000	861.788.981.622
2018	17.966.400	9.49	1.705.011,36	898.320	579.703,86	359.328	14.920,00	1.810	864.918.162.700,80	65.038.368.000	929.956.530.701
2019	17.943.200	9.59	1.720.752,88	897.160	585.055,98	358.864	15.900,00	1.920	930.239.006.928,00	68.901.888.000	999.140.894.928
2020	17.920.000	9.69	1.736.448,00	896.000	590.392,32	358.400	16.880,00	2.030	996.582.236.160,00	72.755.200.000	1.069.337.436.160
2021	17.896.800	9.79	1.752.096,72	894.840	595.712,88	357.936	17.860,00	2.140	1.063.943.212.252,80	76.598.304.000	1.140.541.516.253
2022	17.873.600	9.89	1.767.699,04	893.680	601.017,67	357.472	18.840,00	2.250	1.132.317.297.062,40	80.431.200.000	1.212.748.497.062
2023	17.850.400	9.99	1.783.254,96	892.520	606.306,69	357.008	19.820,00	2.360	1.201.699.852.444,80	84.253.888.000	1.285.953.740.445
2024	17.827.200	10.09	1.798.764,48	891.360	611.579,92	356.544	20.800,00	2.470	1.272.086.240.256,00	88.066.368.000	1.360.152.608.256
2025	17.804.000	10.19	1.814.227,60	890.200	616.837,38	356.080	21.780,00	2.580	1.343.471.822.352,00	91.868.640.000	1.435.340.462.352
2026	17.780.800	10.29	1.829.644,32	889.040	622.079,07	355.616	22.760,00	2.690	1.415.851.960.588,80	95.660.704.000	1.511.512.664.589
2027	17.757.600	10.39	1.845.014,64	887.880	627.304,98	355.152	23.740,00	2.800	1.489.222.016.822,40	99.442.560.000	1.588.664.576.822
2028	17.734.400	10.49	1.860.338,56	886.720	632.515,11	354.688	24.720,00	2.910	1.563.577.352.908,80	103.214.208.000	1.666.791.560.909
2029	17.711.200	10.59	1.875.616,08	885.560	637.709,47	354.224	25.700,00	3.020	1.638.913.330.704,00	106.975.648.000	1.745.888.978.704
2030	17.688.000	10.69	1.890.847,20	884.400	642.888,05	353.760	26.680,00	3.130	1.715.225.312.064,00	110.726.880.000	1.825.952.192.064
2031	17.664.800	10.79	1.906.031,92	883.240	648.050,85	353.296	27.660,00	3.240	1.792.508.658.844,80	114.467.904.000	1.906.976.562.845
2032	17.641.600	10.89	1.921.170,24	882.080	653.197,88	352.832	28.640,00	3.350	1.870.758.732.902,40	118.198.720.000	1.988.957.452.902
2033	17.618.400	10.99	1.936.262,16	880.920	658.329,13	352.368	29.620,00	3.460	1.949.970.896.092,80	121.919.328.000	2.071.890.224.093

Appendix 2 Estimating Earnings After Tax of PG Krebet Baru Without Replacement Project 2013-2033

Year	Total Earnings	Production Cost	Gross Profit	Business Cost	Business Profit (Loss)	Miscellaneous Earnings	Miscellaneous Expense	Depreciation	EBIT	Tax (25%)	EAT
2013	599.379.699.677	189.031.456.250	410.348.243.427	35.302.907.400	375.045.336.027	1.318.334.200	33.949.532.200	664.300.000	341.855.038.027	85.463.759.507	256.391.278.520
2014	663.433.606.720	207.912.394.520	455.521.212.200	37.970.474.800	417.550.737.400	1.287.707.600	34.298.611.200	664.300.000	383.980.733.800	95.995.183.450	287.985.550.350
2015	728.522.881.488	226.792.368.250	501.730.513.238	40.638.042.200	461.092.471.038	1.257.081.000	34.647.690.200	664.300.000	427.142.761.838	106.785.690.460	320.357.071.379
2016	794.642.885.837	245.671.377.440	548.971.508.397	43.305.609.600	505.665.898.797	1.226.454.400	34.996.769.200	664.300.000	471.336.483.997	117.834.120.999	353.502.362.998
2017	861.788.981.622	264.549.422.090	597.239.559.532	45.973.177.000	551.266.382.532	1.195.827.800	35.345.848.200	664.300.000	516.557.262.132	129.139.315.533	387.417.946.599
2018	929.956.530.701	283.426.502.200	646.530.028.501	48.640.744.400	597.889.284.101	1.165.201.200	35.694.927.200	664.300.000	562.800.458.101	140.700.114.525	422.100.343.576
2019	999.140.894.928	302.302.617.770	696.838.277.158	51.308.311.800	645.529.965.358	1.134.574.600	36.044.006.200	664.300.000	610.061.433.758	152.515.358.440	457.546.075.319
2020	1.069.337.436.160	321.177.768.800	748.159.667.360	53.975.879.200	694.183.788.160	1.103.948.000	36.393.085.200	664.300.000	658.335.550.960	164.583.887.740	493.751.663.220
2021	1.140.541.516.253	340.051.955.290	800.489.560.963	56.643.446.600	743.846.114.363	1.073.321.400	36.742.164.200	664.300.000	707.618.171.563	176.904.542.891	530.713.628.672
2022	1.212.748.497.062	358.925.177.240	853.823.319.822	59.311.014.000	794.512.305.822	1.042.694.800	37.091.243.200	664.300.000	757.904.657.422	189.476.164.356	568.428.493.067
2023	1.285.953.740.445	377.797.434.650	908.156.305.795	61.978.581.400	846.177.724.395	1.012.068.200	37.440.322.200	664.300.000	809.190.370.395	202.297.592.599	606.892.777.796
2024	1.360.152.608.256	396.668.727.520	963.483.880.736	64.646.148.800	898.837.731.936	981.441.600	37.789.401.200	664.300.000	861.470.672.336	215.367.668.084	646.103.004.252
2025	1.435.340.462.352	415.539.055.850	1.019.801.406.502	67.313.716.200	952.487.690.302	950.815.000	38.138.480.200	664.300.000	914.740.925.102	228.685.231.276	686.055.693.827
2026	1.511.512.664.589	434.408.419.640	1.077.104.244.949	69.981.283.600	1.007.122.961.349	920.188.400	38.487.559.200	664.300.000	968.996.490.549	242.249.122.637	726.747.367.912
2027	1.588.664.576.822	453.276.818.890	1.135.387.757.932	72.648.851.000	1.062.738.906.932	889.561.800	38.836.638.200	664.300.000	1.024.232.730.532	256.058.182.633	768.174.547.899
2028	1.666.791.560.909	472.144.253.600	1.194.647.307.309	75.316.418.400	1.119.330.888.909	858.935.200	39.185.717.200	664.300.000	1.080.445.006.909	270.111.251.727	810.333.755.182
2029	1.745.888.978.704	491.010.723.770	1.254.878.254.934	77.983.985.800	1.176.894.269.134	828.308.600	39.534.796.200	664.300.000	1.137.628.681.534	284.407.170.384	853.221.511.151
2030	1.825.952.192.064	509.876.229.400	1.316.075.962.664	80.651.553.200	1.235.424.409.464	797.682.000	39.883.875.200	664.300.000	1.195.779.116.264	298.944.779.066	896.834.337.198
2031	1.906.976.562.845	528.740.770.490	1.378.235.792.355	83.319.120.600	1.294.916.671.755	767.055.400	40.232.954.200	664.300.000	1.254.891.672.955	313.722.918.239	941.168.754.716
2032	1.988.957.452.902	547.604.347.040	1.441.353.105.862	85.986.688.000	1.355.366.417.862	736.428.800	40.582.033.200	664.300.000	1.314.961.713.462	328.740.428.366	986.221.285.097
2033	2.071.890.224.093	566.466.959.050	1.505.423.265.043	88.654.255.400	1.416.769.009.643	705.802.200	40.931.112.200	664.300.000	1.375.984.599.643	343.996.149.911	1.031.988.449.732

Appendix 3 Estimating Earnings After Tax of PG Krebet Baru Without Replacement Project 2013-2033

Year	Total Earnings	Production Cost	Gross Profit	Business Cost	Business Profit (Loss)	Miscellaneous Earnings	Miscellaneous Expense	Depreciation	EBIT	Tax 25%	EAT
2013	599.379.699.677	189.031.456.250	410.348.243.427	35.302.907.400	375.045.336.027	1.318.334.200	33.949.532.200	304.500.000	342.109.638.027	85.527.409.506,70	256.582.228.520
2014	663.433.606.720	207.912.394.520	455.521.212.200	37.970.474.800	417.550.737.400	1.287.707.600	34.298.611.200	304.500.000	384.235.333.800	96.058.833.450,00	288.176.500.350
2015	728.522.881.488	226.792.368.250	501.730.513.238	40.638.042.200	461.092.471.038	1.257.081.000	34.647.690.200	304.500.000	427.397.361.838	106.849.340.459,50	320.548.021.379
2016	794.642.885.837	245.671.377.440	548.971.508.397	43.305.609.600	505.665.898.797	1.226.454.400	34.996.769.200	304.500.000	471.591.083.997	117.897.770.999,20	353.693.312.998
2017	861.788.981.622	264.549.422.090	597.239.559.532	45.973.177.000	551.266.382.532	1.195.827.800	35.345.848.200	304.500.000	516.811.862.132	129.202.965.533,10	387.608.896.599
2018	929.956.530.701	283.426.502.200	646.530.028.501	48.640.744.400	597.889.284.101	1.165.201.200	35.694.927.200	52.500.000	563.307.058.101	140.826.764.525,20	422.480.293.576
2019	999.140.894.928	302.302.617.770	696.838.277.158	51.308.311.800	645.529.965.358	1.134.574.600	36.044.006.200	52.500.000	610.568.033.758	152.642.008.439,50	457.926.025.319
2020	1.069.337.436.160	321.177.768.800	748.159.667.360	53.975.879.200	694.183.788.160	1.103.948.000	36.393.085.200	52.500.000	658.842.150.960	164.710.537.740,00	494.131.613.220
2021	1.140.541.516.253	340.051.955.290	800.489.560.963	56.643.446.600	743.846.114.363	1.073.321.400	36.742.164.200	0	708.177.271.563	177.044.317.890,70	531.132.953.672
2022	1.212.748.497.062	358.925.177.240	853.823.319.822	59.311.014.000	794.512.305.822	1.042.694.800	37.091.243.200	0	758.463.757.422	189.615.939.355,60	568.847.818.067
2023	1.285.953.740.445	377.797.434.650	908.156.305.795	61.978.581.400	846.177.724.395	1.012.068.200	37.440.322.200	0	809.749.470.395	202.437.367.598,70	607.312.102.796
2024	1.360.152.608.256	396.668.727.520	963.483.880.736	64.646.148.800	898.837.731.936	981.441.600	37.789.401.200	0	862.029.772.336	215.507.443.084,00	646.522.329.252
2025	1.435.340.462.352	415.539.055.850	1.019.801.406.502	67.313.716.200	952.487.690.302	950.815.000	38.138.480.200	0	915.300.025.102	228.825.006.275,50	686.475.018.827
2026	1.511.512.664.589	434.408.419.640	1.077.104.244.949	69.981.283.600	1.007.122.961.349	920.188.400	38.487.559.200	0	969.555.590.549	242.388.897.637,20	727.166.692.912
2027	1.587.199.872.000	453.276.818.890	1.133.923.053.110	72.648.851.000	1.061.274.202.110	889.561.800	38.836.638.200	0	1.023.327.125.710	255.831.781.427,50	767.495.344.283
2028	1.652.386.944.000	472.144.253.600	1.180.242.690.400	75.316.418.400	1.104.926.272.000	858.935.200	39.185.717.200	0	1.066.599.490.000	266.649.872.500,00	799.949.617.500
2029	1.717.563.808.000	491.010.723.770	1.226.553.084.230	77.983.985.800	1.148.569.098.430	828.308.600	39.534.796.200	0	1.109.862.610.830	277.465.652.707,50	832.396.958.123
2030	1.782.730.464.000	509.876.229.400	1.272.854.234.600	80.651.553.200	1.192.202.681.400	797.682.000	39.883.875.200	0	1.153.116.488.200	288.279.122.050,00	864.837.366.150
2031	1.847.886.912.000	528.740.770.490	1.319.146.141.510	83.319.120.600	1.235.827.020.910	767.055.400	40.232.954.200	0	1.196.361.122.110	299.090.280.527,50	897.270.841.583
2032	1.913.033.152.000	547.604.347.040	1.365.428.804.960	85.986.688.000	1.279.442.116.960	736.428.800	40.582.033.200	0	1.239.596.512.560	309.899.128.140,00	929.697.384.420
2033	1.978.169.184.000	566.466.959.050	1.411.702.224.950	88.654.255.400	1.323.047.969.550	705.802.200	40.931.112.200	0	1.282.822.659.550	320.705.664.887,50	962.116.994.663

Appendix 4 Incremental Cash Flow of PG Krebet Baru 2014-2033

Year	EAT of New Plant (1)	EAT of Old Plant (2)	Incremental EAT (3)	Depreciation of New Plant (4)	Depreciation of Old Plant (5)	Incremental depreciation (6)	Incremental of Cash Flow (7)
			(1) - (2)			(3) – (4)	(3)+(6)
2014	287.985.550.350	288.176.500.350	-269.850.000	664.300.000	304.500.000	359.800.000	89.950.000
2015	320.357.071.379	320.548.021.379	-269.850.000	664.300.000	304.500.000	359.800.000	89.950.000
2016	353.502.362.998	353.693.312.998	-269.850.000	664.300.000	304.500.000	359.800.000	89.950.000
2017	387.417.946.599	387.608.896.599	-269.850.000	664.300.000	304.500.000	359.800.000	89.950.000
2018	422.100.343.576	422.480.293.576	-458.850.000	664.300.000	52.500.000	611.800.000	152.950.000
2019	457.546.075.319	457.926.025.319	-458.850.000	664.300.000	52.500.000	611.800.000	152.950.000
2020	493.751.663.220	494.131.613.220	-458.850.000	664.300.000	52.500.000	611.800.000	152.950.000
2021	530.713.628.672	531.132.953.672	-498.225.000	664.300.000	0	664.300.000	166.075.000
2022	568.428.493.067	568.847.818.067	-498.225.000	664.300.000	0	664.300.000	166.075.000
2023	606.892.777.796	607.312.102.796	-498.225.000	664.300.000	0	664.300.000	166.075.000
2024	646.103.004.252	646.522.329.252	-498.225.000	664.300.000	0	664.300.000	166.075.000
2025	686.055.693.827	686.475.018.827	-498.225.000	664.300.000	0	664.300.000	166.075.000
2026	726.747.367.912	727.166.692.912	-498.225.000	664.300.000	0	664.300.000	166.075.000
2027	768.174.547.899	767.495.344.283	600.303.617	664.300.000	0	664.300.000	1.264.603.617
2028	810.333.755.182	799.949.617.500	10.305.237.682	664.300.000	0	664.300.000	10.969.537.682
2029	853.221.511.151	832.396.958.123	20.745.653.028	664.300.000	0	664.300.000	21.409.953.028
2030	896.834.337.198	864.837.366.150	31.918.071.048	664.300.000	0	664.300.000	32.582.371.048
2031	941.168.754.716	897.270.841.583	43.819.013.134	664.300.000	0	664.300.000	44.483.313.134
2032	986.221.285.097	929.697.384.420	56.445.000.677	664.300.000	0	664.300.000	57.109.300.677
2033	1.031.988.449.732	962.116.994.663	69.792.555.070	664.300.000	0	664.300.000	70.456.855.070